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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Visco et al.

Attorney Docket No.: PLUSP036

Application No.: 10/772,157

Examiner: Monique M. Wills

Filed: February 3, 2004

Group: 1746

Title: ACTIVE METAL/AQUEOUS
ELECTROCHEMICAL CELLS AND
SYSTEMS

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first-class mail on July 20, 2005 in an envelope addressed to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450.

Signed:

Tara Hayden

PETITION TO MAKE SPECIAL UNDER 37 C.F.R. SECTION 1.102 (c)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The applicant hereby petitions, pursuant to 37 CFR 1.102 (c), that the subject patent application be accorded "special" status and be advanced to an early examination based upon material of contribution of the subject invention to enhancement of the environment and conservation of energy resources.

It is widely known that lithium metal reacts violently with water, and even more violently with aqueous acidic solutions. Aqueous battery systems have been attempted previously using unprotected lithium metal electrodes. However, due to the rapid corrosion of unprotected lithium metal electrodes in water, batteries formed using such electrodes would have very short life, and have limited commercial appeal due to safety problems. However, it has been found that a cell composed of a lithium electrode protected in accordance with the present invention can be immersed into acidic aqueous electrolytes without incident. The thermodynamic open circuit potential is observed vs. a Ag/AgCl reference and a normal hydrogen electrode and lithium can be discharged into the aqueous electrolyte causing hydrogen evolution to occur at a Pt counter electrode, with no evidence of

corrosion or chemical reaction at the lithium electrode. It has been further shown that such a protected lithium electrode can be immersed into an aqueous bath having dissolved LiOH, and the lithium electrode can be reversibly cycled in such an aqueous electrolyte. Prior experiments showing these results are unknown. This discovery enables a number of unique battery systems to be developed, including Li/water and Li/air batteries. The protected lithium electrode and shows no evidence of corrosion/chemical reaction with aqueous electrolytes. The approach has been endorsed by the US Army CECOM for the development of lightweight Li/air batteries for military applications. Battery cells and other electrochemical structures incorporating these protected electrodes should have wide commercial appeal and associated benefits for the environment and energy resources of the United States.

The invention makes the manufacture and use of high energy density active metal batteries, such as lithium metal batteries, more attractive. The invention includes both primary and rechargeable battery cells. Wide use of such lithium metal batteries should have a material impact on the environment and energy resources of this country.

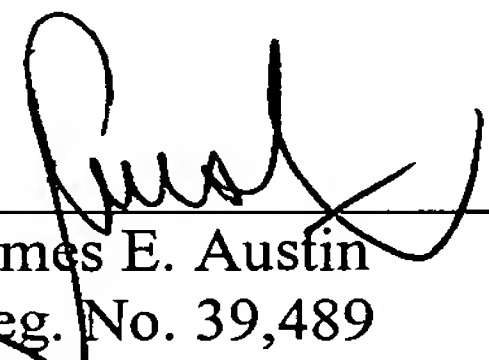
It is believed that the invention will materially enhance quality of the environment at least because, lithium metal batteries, a preferred embodiment of the present invention, do not include toxic heavy metals such as cadmium and lead found in some other commercially important batteries. Development of an alternative and improved battery power source with lesser negative environmental consequences associated with its manufacture and disposal than existing technologies will improve environmental quality. Second, development of a suitable battery power source for electric vehicles has been a major impediment to the large scale deployment of such electric vehicles. Lithium batteries are promising candidates for electric vehicle power supplies because, among other reasons, have far greater energy content per weight and volume than other commercial rechargeable batteries including nickel-cadmium and nickel-metal-hydride batteries. Because such electric vehicles powered by lithium batteries will produce no emissions, it is believed that their large scale deployment in major cities would improve the air quality therein.

It is also believed that the invention will materially contribute to the development and/or conservation of energy resources. If lithium batteries provide the needed impetus for wide-scale deployment of electric vehicles, US electric power utilities will have to increase their capacity to supply electricity to charge the fleet of electric vehicles. Because such

electricity can be produced from a variety of resources, including fossil fuels, it is believed that the present invention could well contribute to the development of existing (e.g., fossil fuels) and alternative (e.g., solar; fuel cell (hydrogen)) energy resources as well as the conservation of energy resources by reducing the need for less efficient power sources that consume a disproportionate amount of energy resources for the energy actually produced.

I declare that all statements made herein of my own knowledge are true; that all statements made on the information and behalf are believed to be true and further that these statements made with the knowledge that willful false statements are punishable by fine or imprisonment, or both under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date 1/24/2006



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